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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/523,281

10/18/2005

Kazuhiro Ohba

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EXAMINER

KLIMOWICZ, WILLIAM JOSEPH

ART UNIT

PAPER NUMBER

2627

MAIL DATE

DELIVERY MODE

10/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/523,281

Applicant(s)

OHBA ET AL.

Examiner

William J. Klimowicz

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

Claims 1 and 4 objected to because of the following informalities and appropriate correction is required.

The following phrase(s) lack clear antecedent basis within the claim(s), i.e., either the particularly recited passage fails to be properly introduced prior to its appearance at that point in the claim or the structure recited in the passage is not an inherent part of or component of the previously recited structure. The lack of antecedence as noted *infra*, is merely formal, since the claims can be understood in light of the instant specification and drawings; the antecedence informalities delineated below do not rise to the level of a rejection under 35 USC 112 2nd paragraph:

(i) Claim 1 (line 7), “said intermediate layer.”

(i) Claim 4 (line 10), “said intermediate layer.”

Additionally, with regard to claim 4 (line 6), the phrase “a word line a bit line” is somewhat awkward, and should be reworded.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Gill (US 6,181,537 B1).

As per claim 1, Gill (US 6,181,537 B1) discloses in a magnetoresistive device having a pair of ferromagnetic layers (e.g., 215, 230) opposed to each other to obtain variations in magnetoresistance by an electric current (It) flowing to the direction perpendicular to the film plane, a magnetoresistive device characterized in that said pair of ferromagnetic layers (215, 230) is composed of a magnetization fixed layer (215) made of a crystalline ferromagnetic layer provided under an intermediate layer (225) and a magnetization free layer (230) being made of an amorphous ferromagnetic layer being provided above said intermediate layer (225).

As per claim 3 (as well as claim 6, rejected *infra*) characterized in that said magnetoresistive device is a tunnel magnetoresistive device - see abstract of Gill (US 6,181,537 B1) - using a tunnel barrier layer (225) made of an insulating material or a semiconducting material as said intermediate layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (US 6,181,537 B1).

See the description of Gill (US 6,181,537 B1), *supra*.

As per claim 2 (and claim 5, rejected, *infra*), although Gill (US 6,181,537 B1) does not expressly disclose wherein the magnetoresistive device has a laminated ferri structure, Official notice is taken that such ferri-laminated structures associated with either the free or pinned layers are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a conventionally laminated ferri structure to the head of Gill (US 6,181,537 B1), as is widely known in the MR art.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide a conventionally laminated ferri structure to the head of Gill (US 6,181,537 B1), as is widely known in the MR art in order to, *inter alia*, mitigate the magneto-static coupling between the pinned layer and the free layer, as is well known, established and appreciated in the art.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyatke et al. (US 6,842,361 B2) in view of Gill (US 6,181,537 B1).

As per claim 4, Miyatke et al. (US 6,842,361 B2) discloses a magnetic memory apparatus (12) comprising: a magnetoresistive device (38) having a pair of ferromagnetic layers (32, 36) opposed to each other to obtain variations in magnetoresistance by an electric current flowing to the direction perpendicular to the film plane; a word line (50) and a bit line (46) sandwiching said magnetoresistive device (38) in the thickness direction, wherein said magnetic memory apparatus includes said pair of ferromagnetic layers (32, 36) composed of a magnetization fixed

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layer (36) made of a ferromagnetic layer provided under an intermediate layer (34) and a magnetization free layer (32) being made of a ferromagnetic layer being provided above said intermediate layer (34).

As per claim 4, however, Miyatke et al. (US 6,842,361 B2) does not expressly disclose wherein the magnetization fixed layer (36) made of a crystalline ferromagnetic layer and wherein the magnetization free layer is made of an amorphous ferromagnetic layer.

Gill (US 6,181,537 B1), however, discloses an analogous magnetoresistive device having a pair of ferromagnetic layers (e.g., 215, 230) opposed to each other to obtain variations in magnetoresistance by an electric current (I_t) flowing to the direction perpendicular to the film plane, a magnetoresistive device characterized in that said pair of ferromagnetic layers (215, 230) is composed of a magnetization fixed layer (215) made of a crystalline ferromagnetic layer provided under an intermediate layer (225) and a magnetization free layer (230) being made of an amorphous ferromagnetic layer being provided above said intermediate layer (225).

Given the express teachings and motivations, as espoused by Gill (US 6,181,537 B1), it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the magnetization fixed layer of Miyatke et al. (US 6,842,361 B2) as being made of a crystalline ferromagnetic layer and the magnetization free layer is made of an amorphous ferromagnetic layer, as expressly suggested by Gill (US 6,181,537 B1).

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the magnetization fixed layer of Miyatke et al. (US 6,842,361 B2) as being made of a crystalline ferromagnetic layer and the magnetization free layer is made of an amorphous ferromagnetic layer, as expressly suggested by Gill (US 6,181,537 B1) in order to reduce the

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ferromagnetic coupling between the free and pinned layers of a tunnel magnetoresistance sensor device.

As per the rejection of claim 5, see the discussion of claim 2, *supra*.

As per the rejection of claim 6, see the discussion of claim 3, *supra*.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (571) 272-7577. The examiner can normally be reached on Monday-Friday (7:30AM-6:00PM).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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William J. Klimowicz
Primary Examiner
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WJK